Claims

1. An apparatus for coating the outer peripheral surface of a pillar structure which is provided with a holding means which holds the pillar structure in nearly vertical direction and rotates together with the held pillar structure on an axis of nearly vertical direction as a common rotating axis, a supplying and coating means which supplies a coating material to the outer peripheral surface of the rotating pillar structure and coats the coating material on the outer peripheral surface and a plate-like smoothing means the one longer side end portion of which is disposed at a given position with respect to the outer peripheral surface and which smoothes the coating surface of the coating material supplied to and coated on the outer peripheral surface, wherein the smoothing means has a smoothing plate and a sheet-like elastic body provided at the longer side end portion of the smoothing plate on the side of the pillar structure, the elastic body is disposed so that it contacts with the outer peripheral surface of the pillar structure, the coating material is supplied to and coated on the outer peripheral surface through the elastic body, and the coating surface is smoothed between the outer peripheral surface and the elastic body.

2. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 1, wherein the smoothing means is disposed so that its longer direction nearly coincides with the central axis direction of the pillar structure and the elastic body constituting the smoothing means

is disposed so that it contacts with the outer peripheral surface of the pillar structure between both end faces of the pillar structure.

3. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 1 or 2, wherein the holding means holds the pillar structure placed thereon with one end thereof facing downward and has a pedestal rotating together with the held pillar structure on the axis of the nearly vertical direction as the common rotating axis.

4. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 3, wherein the holding means has a cam which is disposed on the side of another end of the pillar structure placed and held on the pedestal and rotates on the axis of the nearly vertical direction as the common rotating axis.

5. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 4, wherein the outer peripheral shape of the pedestal and that of the cam are nearly the same.

6. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 3-5 which is further provided with a centering means which holds the pillar structure and the pedestal and/or the cam in a given positional relation.

7. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 3-6 which is further provided with a following means which drives the smoothing means following the outer periphery of the pedestal

and/or the cam so that the smoothing means is disposed at a given position with respect to the outer peripheral surface of the pillar structure.

8. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 4-7, wherein the following means has first and second following rollers which are disposed at a given distance from each other and move backward and forward following the outer periphery of the cam while contacting with the outer periphery of the cam together with the supplying and coating means and the smoothing means, and the first and second following rollers are disposed so that the angle formed by a straight line passing through the centers of the respective rollers and a tip portion of the smoothing means is a given angle.

9. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 8, wherein the following means further has third and fourth following rollers which move backward and forward following the outer periphery of the pedestal while contacting with the outer periphery of the pedestal together with the supplying and coating means and the smoothing means, and the rotating axis of the third following roller and that of the first following roller are common and the rotating axis of the fourth following roller and that of the second following roller are common.

10. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-9, wherein the sheet-like elastic body has a width of 1-10 mm.

11. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-10, wherein the sheet-like elastic body has a thickness of 1-5 mm.

12. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-11, wherein the sheet-like elastic body has a hardness of 30-80.

13. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-12, wherein the elastic body comprises rubber or sponge.

14. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 3-13, wherein the outer periphery of the pedestal and/or the cam comprise stainless steel or ceramics.

15. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-14, wherein the smoothing plate comprises stainless steel or ceramics.

16. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-15, wherein the shape of a section of the pillar structure cut along a plane perpendicular to the central axis of the pillar structure is circular or elliptical.

17. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-16, wherein the pillar structure is a honeycomb structure comprising a plurality of cells which are flow paths for fluid.

18. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-17, wherein the supplying and coating means and the smoothing means can rotate together along the outer periphery of the pillar structure.

19. A method for coating the outer peripheral surface of a pillar structure using the apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-18 which comprises holding the pillar structure by the holding means, supplying the coating material from the supplying and coating means on the outer peripheral surface of the pillar structure and coating the coating material thereon while rotating the pillar structure and the holding means on the axis of nearly vertical direction as a common rotating axis, and smoothing the coating surface of the supplied and coated coating material between the outer peripheral surface and the sheet-like elastic body.